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ABSTRACT

Given the general agreement that learning of texts is facilitated by learners using relevant concepts or schemata to subsume contents, a study was conducted to see if giving learners an advance organizer and requiring anticipation activity would help in the formation of new schemata and, therefore, result in the enhancement of learning. Subjects were 264 undergraduates. They were given three prose texts to read, each followed by an immediate cued recall test and a delayed recall test on all three texts after 25 minutes of interpolated tasks. Prior to the learning of the texts, which contained examples following rules, half the learners were given the rules as an advance organizer and half were not. Each of these two groups were halved again into groups required to anticipate using the rules or not. Results indicated that the advance organizer had a facilitative effect on the grasp and application of the rules, but had no effect on the recall of the texts governed by the rules. There was no evidence that the advance organizer helped in the formation of the relevant schemata. Anticipation activity had a facilitative effect on the recall of the second and third texts even in the group without the advance organizer. These results suggest that requiring anticipation facilitated using the rules, which resulted in an improved grasp of them. (JL)

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The Effects of Advance Organizer and Anticipation Activity on the Learning of Texts

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It has generally been agreed that learning of texts is facilitated by learners' relevant concept or schema to subsume contents (e.g., Rumelhart and Ortony, 1977). If learners do not possess it, how can we help the learners? Ausubel, D. P. (1968) proposed giving an advance organizer. The information given as the expository organizer is supposed to help in the formation of an appropriate new subsumer or schema, which, if it is used in the learning of text, results in the enhancement of learning. It has also been suggested that requiring anticipation activity facilitates the use of schema in the learning of text. (Kuhara, 1980).

In the present study, prior to the learning of texts containing examples following the rules, half the learners were given the rules as an advance organizer, half were not, and half of each of these groups were required to anticipate using the rules. We examined possible facilitative effects on the learning of texts, measuring this not only by recall tests but also by rule-tests and a rule-application-test.

Method

Two hundred and sixty-four undergraduates were given three prose texts to read, each followed by an immediate cued recall test, and by a delayed recall test on all the three texts after 25 minutes of interpolated tasks. The students were also tested on their grasp of the rules governing the details of the texts twice using the same

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test, and on the application of the rules. The outline of the procedures is shown in Table 1.

Insert Table 1 about here.

Two factors, the presence or absence of an advance organizer (AO or NO) and the requirement or not of anticipation activity, both between subjects factors, were combined factorially to produce 4 experimental conditions. The students were randomly assigned to one of these four conditions (n=66 each).

The three texts used described the genesis, structure and growth of different mammals, i.e., the giraffe, fox and opossum, whose brains are respectively highly, moderately and poorly developed. (The names of the animals were not given to the students.) Each text consisted of 18 idea units, each of which was expressed in one sentence. Six of the 18 idea units were the same in all three texts, and the other 12 differed from text to text. The relationships between brain development, and the genesis and growth of the young described in the varied idea units were governed by rules. An example of the texts (for the giraffe) is shown in Table 2.

(constant idea units)

(varied idea units)

Insert Table 2 about here.

Half the learners read a passage explaining the rules (the advance organizer, AO) at the beginning of the experiment. The other half were not given the rules but another passage explaining the specificity of human beings (which do not obey the rules) among mammals (NO).

The learners in the with-anticipation groups were given a couple of idea units from the text as anticipation cues before presentation of the second and third complete texts, and required to anticipate

other details by choosing one from two or three alternatives. They were allowed three minutes for this cued anticipation and then given two minutes to read the complete texts. The learners in the without-anticipation groups were asked to read each complete text for two and a half minutes.

Each immediate cued recall test consisted of 18 completion or short answer questions, in each of which the idea unit , varied or constant, was to be filled in. The responses only on the 12 varied items were scored. The delayed recall test consisted of 16 questions, because two items, one varied and one constant, were given to students as cues. Thus the maximal score was 11.

The tests of the rules consisted of 6 pairs of questions each on idealized prototypes (Nestfluchter and Nesthocker), each with two alternative multiple choice answers. Students were given one item of information on each prototype as a cue, and asked to answer on the others.

The test of applying the rules to new examples consisted of 13 pairs of descriptions. Students were asked to judge whether the relationships within a pair were consistent, inconsistent or irrelevant to the rules.

Results

The proportion of correct responses in the immediate and delayed recall tests, the tests of the rules I & II, and the test of applying the rules are shown in Table 3.

Insert Table 3 about here.

All test scores were analyzed using a 2 x 2 analysis of the variance.

Facilitation of the Acquisition of the Rules by an Advance Organizer

The ANOVA for the scores of the rule-tests I & II and the rule-application-test showed that only the main effect of the presence of an AO was significant ($F(1,260)=141.1$, $p<.001$, $F(1,260)=42.7$, $p<.001$, $F(1,260)=15.5$, $p<.001$). The scores of the AO groups were higher than those of the NO groups in both the with- and without-anticipation conditions.

The ANOVA for the recall tests, both immediate and delayed, did not show any significant main effects of the presence of an AO. The AO had no facilitative effects on recall.

The Enhancement of Recall by Anticipation Activities

The ANOVA for the immediate recall of the second text, which was learned either with- or without-anticipation, showed no significant main effects, but a significant interaction ($F(1,260)=4.7$, $p<.05$). Anticipation activity did not enhance recall for the AO groups, but did enhance it for the NO groups.

In the immediate recall of the third text, which was learned either with- or without-anticipation, only the effect of anticipation was significant, showing enhancement due to anticipation activity ($F(1,26)=5.9$, $p<.05$).

In the delayed recall of the three texts only the main effect of anticipation was significant, showing the facilitative effects of anticipation activity ($F(1,260)=25.0$, $p<.001$). Separate ANOVAs for each of three texts showed exactly the same pattern.

In the rule-tests I & II and the rule-application-test, anticipation activity was not effective.

Discussion

As expected, AO had a facilitative effect on the grasp and application of the rules, but it had no effects on the recall of the texts governed by the rules. The rule-test I, which was administered just before the learning of the first text, showed large differences between the AO and the NO groups. The recall of the first text, which was learned without anticipation by all groups, showed no differences between the groups. Moreover, the superiority of the AO groups in the rule-test II, which was administered just before the delayed test, did not extend to the delayed test, though the effects of anticipation activity were greater in the delayed test than in the immediate tests.

These findings suggest that learners used the acquired rules when required to solve problems in the rule-application-test, but did not do so spontaneously (without being required to anticipate) during the learning of the texts. There was no evidence that the information in AO helped the formation of the relevant schema, and this supported Anderson's skepticism for the effectiveness of an advance organizer (Anderson et al., 1978).

Anticipation activity had a facilitative effect on the recall of the second and third texts. This effect was found even in the NO groups. This was probably because learners in the NO groups were able to discover the rules through learning the texts. The inductively formed concept or schema can be expressed in terms of rules later. This was confirmed by evidence that in the NO groups the scores in the rule-tests increased significantly from test I to test II ($t(65)=4.42$, $p<.001$ for the NO with-anticipation group; $t(65)=3.11$, $p<.01$ for the NO without-anticipation group).

The improvement in the grasp of the rules between the two tests

of the rules was greater in the NO with-anticipation group than in the NO without-anticipation group, and in the AO without-anticipation group the score decreased significantly from test I to test II ($t(65)=2.18$, $p<.05$), while in the AO with-anticipation group the score remained at a high level. These results suggest that requiring anticipation facilitated using the rules, which resulted in an improved grasp of the rules.

The results of this study have important implications for teaching and the facilitation of learning. The effective strategies for the enhancement of meaningful learning differ depending upon the aspects of the learning assessed.

References

Anderson, R. C., Spiro, R. J., & Anderson, M. C. Schemata as scaffolding for the representation of information in connected discourse. American Educational Research Journal, 1978, 15, 433-440.

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Reference Note

1. Kuhara, K. Effects of anticipation activity on the recall of texts. Manuscript submitted for publication, 1980.

Table 1

Outline of Procedures

Activity of Students	Materials
Learning	AO or NO passage
Rule-test I	
Learning & recall (Test 1)	First text
[Anticipation	Second text]
Learning & recall (Test 2)	Second text
[Anticipation	Third text]
Learning & recall (Test 3)	Third text
Rule-application-test	
Rule-test II	
Delayed recall	All three texts

Note. [ ] -- with-anticipation groups only

Table 2

An Example of the Texts (Giraffe)

This passage describes an animal, GC.

GC belongs to the class of mammals. Its brain is highly developed. It is four-legged. It possesses teeth. Young are not hatched from an egg but are born as a human child is. The gestation period is very long. It is about 440 days. The number of young in a litter is small. It is usually 1. It is occasionally 2. It raises its young on milk. The weight of one of the newborn young is about 1/20 of that of the mother. The appearance of the new-born young is identical to that of the parents. From birth, the young have hair on their bodies. At birth the eyes of the young are already open. The young begin to see immediately. The young remain in the bush for period. The young begin to act outside after about 3 days.

Note. The actual text presented to the students was written in Japanese.

Table 3

Proportion of Correct Responses in the Recall Tests, Rule-tests and Rule-application-test

Condition	Recall				Rule-test		Rule Application Test
	Test 1	Test 2	Test 3	Delayed	I	II	
With-Anticipation							
AO-Group	.82	.88	.92	.77	.97	.97	.67
NO-Group	.81	.91	.93	.76	.64	.80	.55
Without-Anticipation							
AO-Group	.81	.89	.89	.68	.97	.94	.60
NO-Group	.81	.86	.90	.63	.65	.74	.55

of the rules was greater in the NO with-anticipation group than in the NO without-anticipation group, and in the AO without-anticipation group the score decreased significantly from test I to test II ($t(65)=2.18$, $p<.05$), while in the AO with-anticipation group the score remained at a high level. These results suggest that requiring anticipation facilitated using the rules, which resulted in an improved grasp of the rules.

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